

**Amendments to the Claims:**

1.-30. *(Canceled)*

31. *(Previously presented)* A method for guiding a cognitive task of a subject comprising:

measuring activity of one or more internal localized regions of a brain of said subject, wherein said measuring is performed by an apparatus comprising an fMRI;

employing a computer executable logic that takes said measured activity and communicates information based on said measured activity to said subject who is still within said fMRI apparatus; and,

guiding a cognitive task of said subject using said information.

32. *(Previously presented)* The method according to claim 31 wherein said activity measurements are made from a plurality of localized regions of said brain.

33. *(Previously presented)* The method according to claim 31 wherein said measuring brain activity comprises scanning the entire brain.

34.-36. *(Canceled)*

37. *(Previously presented)* The method according to claim 31 wherein a spatial activity pattern is measured from said one or more internal localized regions.

38. *(Canceled)*

39. *(Previously presented)* The method according to claim 37 wherein said one or more internal localized regions has a primary function of releasing a neuromodulatory substance selected from the group consisting of: dopamine, acetyl choline, noradrenaline, serotonin, and endogenous opioids.

40. *(Previously presented)* The method according to claim 31 wherein said subject is identified as having one or more conditions selected from the group consisting of: Parkinson's

disease, Alzheimer's disease, attention deficit disorder, depression, substance abuse and addiction, brain injury, stroke, and schizophrenia.

41. ***(Previously presented)*** The method according to claim 31 wherein said information is communicated in a manner selected from the group consisting: of providing audio to the subject, providing tactile stimuli to the subject, providing a smell to the subject, and displaying an image to the subject.

42. ***(Previously presented)*** The method according to claim 31 wherein said information communicated is an instruction.

43. ***(Previously presented)*** The method according to claim 42 wherein said instruction comprises a text or an iconic indication denoting an action to be performed by said subject.

44. ***(Previously presented)*** The method according to claim 42 wherein said instruction identifies a mental task to be performed by said subject.

45. ***(Previously presented)*** The method according to claim 42 wherein said instruction is selected from a set of instructions stored in memory.

46. ***(Canceled)***

47. ***(Previously presented)*** The method according to claim 31 wherein said information is communicated to said subject comprises a graph or indicator of the level of activation of said one or more internal localized regions to guide said subject to increase or decrease level of activation of said one or more internal localized regions through their cognitive processes.

48.-54. ***(Canceled)***

55. ***(Previously presented)*** The method of claim **31** wherein said information is communicated when said measured activity of one or more internal localized regions of a brain is greater than a preselected threshold level.

56. ***(Previously presented)*** The method of claim **55** wherein said subject is trained to increase said measured activity to be greater than said preselected threshold level.

57. ***(Previously presented)*** The method of claim **31** wherein said cognitive task comprises forming an estimate of said measured activity.

58. ***(Previously presented)*** The method of claim **31** wherein said cognitive task comprises listening to, comprehending, producing or imagining speech.

59. ***(Previously presented)*** The method of claim **31** wherein said cognitive task comprises physical exercise of body extremities.

60. ***(Previously presented)*** The method of claim **31** wherein said cognitive task comprises improving memory.

61. ***(Previously presented)*** The method of claim **31** wherein a computer interface is provided that allows said subject to input information.

62. ***(Previously presented)*** The method of claim **31** wherein said one or more internal localized regions comprise regions associated with neuronal plasticity and learning.

63. ***(Previously presented)*** The method of claim **31** wherein said subject further communicates with an operator by audio and/or video communication.

64. ***(Previously presented)*** The method of claim **31** wherein measuring said fMRI activity further comprises collecting volume data; and pre-processing the volume data by at least one step from the group consisting of: spatial smoothing, temporal filtering, slice time correction,

transformation into standard coordinates, resampling of data, motion correction of data, and regression filtering.

65. ***(Previously presented)*** The method of claim 31 wherein said fMRI measurements are spatially registered to measurements made on different days.

66. ***(Previously presented)*** The method of claim 31 further comprising repeating the method across multiple training sessions.

67. ***(Previously presented)*** The method of claim 31 wherein said communicating said information is performed in substantially real time relative to said measuring step.

68. ***(Previously presented)*** The method of claim 31 wherein said fMRI activity measurements include a spatial pattern comparison metric that compares a spatial pattern of activity in said at least one localized region with a target or reference spatial pattern.

69. ***(Previously presented)*** The method of claim 31 wherein said information is an activity metric computed from one or more regions of interest of the brain.

70. ***(Previously presented)*** The method of claim 31 wherein said information is an activity metric comprising the average signal computed from one or more regions of interest of the brain.

71. ***(Previously presented)*** The method of claim 31 wherein said information is an activity metric comprising the average value from a region of interest at a single time point.

72. ***(Previously presented)*** The method of claim 31 wherein said information is a comparison metric which is the difference between an activity metric for a recent period of time and the same activity metric computed for a reference period of time, such as an earlier period of time.

73. ***(Previously presented)*** The method of claim 31 wherein said information is a chart of the timecourse of activity in a region of interest.

74. ***(New)*** A method for lie detection comprising:

- a) measuring with an fMRI during a trial in which a subject makes assertions of false statements or is providing other stressful information;
- b) measuring with said fMRI during a trial in which said subject makes assertions of truthful statements;
- c) measuring with said fMRI during a trial in which said subject makes one or more assertions of unknown truthfulness; and
- d) comparing said fMRI measurements during said one or more assertions of unknown truthfulness with said fMRI measurements during said assertions of truthful statements and said fMRI measurements during said assertions of false statements or provision of other stressful information.

75. ***(New)*** A software product comprising an algorithm that executes the method of claim 74.

76. ***(New)*** A device comprising:

- a) a brain scanning device; and
- b) a software product that operates said device to execute the method of claim 74.